DESA macroeconomic modelling tool and simulations for SDGs

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Outline

1. Modeling tool and methodology
2. Simulations
3. Modelling capacity building
Modelling tool and methodology

• Expanded World Economic Forecasting Model (WEFM-e)

• Assess impact of BRI on economic development of selected countries

• Simulate impact of investments in Infrastructure on income growth, labor market, fiscal sustainability, poverty reduction and so on
World Economic Forecasting Model

• Started linking country models in 1970s (LINK).
• Since 2005, integrated modelling tool covering 176 countries.

• Multi-country forecasting model
• Error-correction principle
• Supply, Demand, Monetary sides
WEFM - production side

• Potential output growth depends on Trend growth of the Total Factor Productivity (TFP), change in the labor supply (labor force projection) and growth of exports

\[ \Delta YFT_t = \alpha [\Delta LFN_t + \Delta TFP_t] + (1 - \alpha) \Delta XTR_t \]

• Trend growth of TFP depends on TFP growth itself with an error term guarantying that labor productivity does not systematically deviates from the trend growth of TFP

\[ \Delta TFP_t = \psi \Delta TFP_{t-1} + (1 - \psi) \Delta TFP_t + (1 - \psi) \left[ \frac{1}{3} \left( \frac{YER_{t-1}}{LNN_{t-1}} \right) - \Delta TFP_{t-1} \right] \]

• TFP growth is kept constant at 2%, 3% or 4% depending on the level of country development
Changes in WEFM-e

• Create simplified (reduced-form) version of complex non-linear relationships for
  • infrastructure investment and education level in production
  • labor participation based on GDP per capita and education level
  • Poverty reduction
  • Consumption and investment behavior in relation to expected growth and the real interest rate
  • Government debt accumulation and its impact on the country risk premium, real interest rate and the exchange rate with the back loop in private consumption and investment
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Simulations for Kazakhstan

• BRI related investments amounted $4.4 billion during 2012 – 2020.

• Medium period projection until 2023
Investment growth (Modified Model)

- Infrastructure Inv
- Private
- Gvt
CO2 emission (kt)
BRI related investment (SDG 9, 11) ...

• Limited impact in labor force participation and jobs (SDG 8)

• Limited impact on decreasing the gender gap (SDG 5, 8)

• Boosts the productivity growth (SDG 4, 8, 17)

• Leads to a faster output growth (SDG 8)

• Gov deficit and debt manageable (SDG 17)

• Overall, the positive impacts on economic growth, cautions on environment and social indicators.
Future work on WEFM-e

• Data

• Calibrations

• Region-integrated simulations

+ Qualitative studies
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Planned project activities

• Online access to simulation scenarios at www.brisdgs.org

• Interim report (mid 2019), and final report (mid 2020)

• Regional workshops – Bangkok (Sep 2019), Tbilisi (Oct 2019), China (early 2020)

• National workshops in other countries - Kyrgyzstan, Azerbaijan, ... (2019-20).

• In-depth training course on modelling tools including WEFM if requested
Thank You!

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